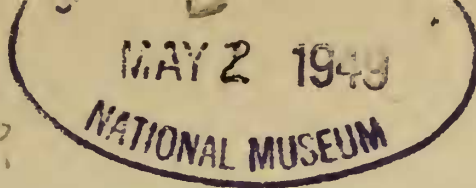


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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

ON A COLLECTION OF SEA-STARS FROM THE
PHILIPPINE ISLANDS

BY AUSTIN H. CLARK¹

The American Museum of Natural History, New York, through Mr. John C. Armstrong, has recently submitted to me for study a collection of sea-stars made by Dr. Willard G. Van Name and Mr. G. R. Oesch in the Gulf of Dávao, south-eastern Mindanao, in 1936 and 1937. I am deeply indebted to the American Museum and to Mr. Armstrong for the privilege of studying this interesting collection.

Although there are many records of sea-stars from the Philippines, most of them are without definite locality or other data. On May 18, 1908, the Bureau of Fisheries steamer *Albatross* made a number of dredge hauls in the Gulf of Dávao at six of which, in from 18 to 28 fathoms, sea-stars were found. In his memoir on the sea-stars of the Philippines published in 1919 (1) Dr. Walter K. Fisher listed from these stations *Protoreaster nodosus*, *Pentaceraster alveolatus*, *Fromia japonica*, *Nardoa squamulosa*, *Ophidiaster fuscus*, *Othilia luzonica* and *Retaster insignis*.

All these species presumably occur in shallow water along the shore, but only *Protoreaster nodosus* and *Othilia luzonica* are represented in the present collection. All but *Retaster insignis* have been taken in shore collecting at Port Galera, Mindoro.

In his memoir on the echinoderms of Torres Strait published in 1921 (2) Dr. Hubert Lyman Clark mentioned several littoral sea-stars from the Philippines, but the only definite records were: *Nardoa pauciforis*, Bantayan reef, Cebu; *Nardoa novaecaledoniae*, *Nardoa tuberculata*, and *Leiaster speciosus*, Port Galera, Mindoro; and *Bunaster lithodes*, Apo reef, Mindoro.

Drs. José S. Domantay and Hilario A. Roxas in 1938 (3) published a list of littoral sea-stars from Port Galera bay in northern Mindoro. This list includes 50 species, but of these

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APR 28 1949

12 are synonyms or varieties. Their *Linckia multifora* from the figures they give appears to be *L. laevigata*. A new species, *Hippasteria philippinensis*, is undoubtedly the young of *Culcita novaeguineae*. They did not include *Leiaster speciosus* from Port Galera listed by Dr. H. L. Clark, or *Bunaster lithodes* from Apo reef.

Although the list of Domantay and Roxas includes 38 species, and the present list only 17, Dr. Van Name and Mr. Oesch secured no less than seven species not found by them. These seven species are: *Goniodiscus forficulatus*, *Ophidiaster lioderma*, *Ophidiaster pustulatus*, *Asterina coronata coronata*, *Asterina cephea*, *Valvaster striatus*, and *Mithrodia clacigera*.

ANNOTATED LIST OF THE SPECIES
ARCHASTERIDAE

Archaster typicus Müller and Troschel

Localities.—Padada Beach, Gulf of Dávao, Mindanao; G. R. Oesch, April 5, 12, May 2, 3, 1936 (5+ specimens).

Mouth of the Padada River; G. R. Oesch, June 23, 24, 1936 (2 specimens).

Notes.—The size ranges from $R = 48$ mm. to $R = 22$ mm. In the largest specimen one arm forks half way to the tip, the two branches diverging in almost a straight line.

GONIASTERIDAE

Goniodiscaster forficulatus (Perrier)

Locality.—Padada Beach; G. R. Oesch, June 20, 1936 (1 specimen).

Note.—This specimen is very small, $R = 11$ mm., $r = 4$ mm.

OREASTERIDAE

Protoreaster nodosus (Linné)

Localities.—About 1.5 miles from the Paloda River, Gulf of Dávao, near Mangrove Island; Dr. W. G. Van Name (2 specimens).

Stony beach just south of Santa Cruz, Gulf of Dávao; Dr. W. G. Van Name, November 7, 1937 (2 specimens).

Notes.—The specimens from near Mangrove Island in life were light yellow with the tubercles and tips of the rays brown. They measured $R = 68$ mm. and $R = 60$ mm. Dr. Van Name said that some individuals are redder, and some brick or rich red.

One of the specimens from near Santa Cruz with $R = 90$ mm. was yellowish, becoming warm brown on the tubercles and toward the tips of the arms; the oral side was wholly yellowish. The other, with $R = 80$ mm., was mostly yellowish gray above, becoming warm brown on the spines and distal part of the arms, and yellowish below.

LINCKIIDAE

Fromia elegans H. L. Clark

Locality.—Puerto Galera, northern end of Mindoro; Dr. W. G. Van Name, October 1937 (3 specimens).

Notes.—The specimens measured $R = 48$ mm., $r = 10$ mm.; $R = 46$ mm., $r = 10$ mm., and $R = 45$ mm., $r = 9$ mm. The color in life was bright red.

This species was described by Dr. H. L. Clark from specimens from Mer, Murray Islands, Torres Strait. He gave the size of the type as $R = 36-38$ mm., $r = 8.5$ mm. (in life nearly 10 mm.).

In 1938 Messrs. Domantay and Roxas recorded it from "Port Galera Bay and other places" and noted that it was the most common species of *Fromia* found at the station. They gave the color as "body brick red with abactinal plates light brick red. Ambulacral, adambulacral, and furrow spines together with paxillae on oral side uniformly brick red."

In 1946 Dr. Clark wrote that "This is an endemic [Australian] species so far as is yet known, and since it has been found at three widely separated points, it is probably pretty well distributed on the tropical coasts of Australia. It has not been found elsewhere, for although Domantay and Roxas (1938) record it from the Philippines, it is evident both from the figures given and from their description of the color in life that their specimens are different from the Australian species."

The specimens at hand are certainly *F. elegans*. The figures given by Domantay and Roxas are rather vague, but there is nothing in them nor in their description to indicate that their determination was not correct.

Nardoa tuberculata Gray

Localities.—Padada Beach; G. R. Oesch, March 8, May 9, 10, June 20, 21, 1936 (22 specimens).

Santa Cruz, Gulf of Dávao; Dr. W. G. Van Name, November 21, 1937 (5 specimens).

Notes.—The specimens range in size from $R = 70$ mm. to $R = 20$ mm. One with $R = 37$ mm. is six-rayed.

Linckia laevigata (Linné)

Localities.—Padada Beach; G. R. Oesch, March 8, May 9, 10, June 20, 21, 25, 26, 28, July 6-19, 1936 (20 specimens).

Reef of Digos, Gulf of Dávao; Dr. W. G. Van Name, November 14, 1937 (4 specimens).

North of Paloda River, Gulf of Dávao; Dr. W. G. Van Name, November 6, 1937 (1 specimen).

About 1.5 miles from the Paloda River, Gulf of Dávao, near Mangrove Island; Dr. W. G. Van Name (1 specimen).

Puerto Galera, northern end of Mindoro; Dr. W. G. Van Name, October 1937 (2 specimens).

Notes.—Large specimens, $R = 90$ to 165 mm., are described as "bright blue" or "blue all over." Two specimens with $R = 75$ mm. and 62 mm. were purplish in life. One with $R = 16-45$ mm. was dull red. One specimen from Padada Beach has three rays 33-27 mm. long and three small buds.

Domantay and Roxas' figures of *Linckia multifora* from Port (or Puerto) Galera appear to me to represent *L. laevigata*. They say that their two specimens of *L. multifora* had only a single madroporite, which would suggest that they were really *L. laevigata*.

Linckia multifora (Lamarck)

Locality.—Padada Beach; G. R. Oesch, May 9, 10, 1936 (2 specimens).

Notes.—In one of the specimens the rays are 27, 17, 17, 17, 15 mm. long; in the other they are 47, 37, 37, 32, 27 mm. long.

Ophidiaster lioderma H. L. Clark

Locality.—Padada Beach; G. R. Oesch, May 9, 10, 1936 (2 specimens).

Note.—In one of the specimens $R = 55$ mm.

Ophidiaster granifer Lütken

Localities.—Padada Beach; G. R. Oesch, March 8, June 5, 6, 20, 21, 23, 24, June 28 to July 8, July 6-19, 1936 (20 specimens).

Mouth of the Padada River; G. R. Oesch, June 23, 24, 1936 (94 specimens).

About 1.5 miles from the Paloda River, Gulf of Dávao, near Mangrove Island; Dr. W. G. Van Name (1 specimen).

Reef of Digor, Gulf of Dávao; Dr. W. G. Van Name, November 14, 1937 (1 specimen).

Santa Cruz, Gulf of Dávao; Dr. W. G. Van Name, November 21, 1937 (1 specimen).

Notes.—The specimens range in size from $R = 30$ mm. to $R = 12$ mm. When dried this species usually has a characteristic broadly blotched light and dark grayish color.

Ophidiaster pustulatus (von Martens)

Locality.—Padada Beach; G. R. Oesch, July 6-19, 1936 (1 specimen).

Notes.— $R = 37$ mm. Pedicellariae with straight alveolae are rather numerous, occurring sometimes on every supermarginal beyond the first six or eight, and frequently elsewhere.

ASTERINIDAE

Asterina coronata coronata von Martens

Localities.—Padada Beach; G. R. Oesch, March 8, May 9, 10, June 20, 21, 28, June 28 to July 8, 1936 (15 specimens).

Mouth of the Padada River, Gulf of Dávao; G. R. Oesch, June 23, 24, 1936 (1 specimen).

Reef of Digos, Gulf of Dávao; Dr. W. G. Van Name, November 14, 1937 (1 specimen).

About 1.5 miles from the Paloda River, Gulf of Dávao; Dr. W. G. Van Name (6 specimens).

One kilometer north of Santa Cruz, Dávao Gulf; Dr. W. G. Van Name, November 20, 1937 (1 specimen).

Asterina cephea Müller and Troschel

Localities.—Padada Beach; G. R. Oesch, March 8, June 20, 21, 25, 26, 28, June 28 to July 8, July 6-19, 1936 (12 specimens).

One kilometer north of Santa Cruz, Dávao Gulf; Dr. W. G. Van Name, November 20, 1937 (1 specimen).

Note.—Dr. Van Name's specimen from north of Santa Cruz is six-rayed.

Patiriella exigua (Lamarck)

Localities.—Padada Beach; G. R. Oech, March 8, May 2, 3, 9, 10, June 20, 21, 28, June 28 to July 8, July 6-19, 1936 (92 specimens).

About 1.5 miles from the Paloda River, Gulf of Dávao, near Mangrove Island; Dr. W. G. Van Name (6 specimens).

Note.—One of the specimens from Padada Beach, March 8, 1936, is six-rayed.

ECHINASTERIDAE

Othilia luzonica Gray

Locality.—Padada Beach; G. R. Oesch, June 28 to July 8, 1936 (1 specimen).

Note.—The single specimen is six-rayed.

ACANTHASTERIDAE

Acanthaster planci (Linné)

Locality.—One kilometer north of Santa Cruz, Gulf of Dávao; Dr. W. G. Van Name, November 20, 1937 (1 specimen).

Notes.—This specimen has 13 rays 90 mm. long. In life the upper surface was gray with small purple dots, the spines brown.

VALVASTERIDAE

Valvaster striatus Perrier

Locality.—Puerto Galera, northern end of Mindanao; Dr. W. G. Van Name, October 24, 1937 (1 specimen).

Notes.—R = 55 mm., r = 17 mm. The color in life was yellowish with brown markings.

MITHRODIIDAE

Mithrodia clavigera (Lamarck)

Localities.—Padada Beach; G. R. Oesch, July 6-19, 1936 (fragments). Santa Cruz, Gulf of Dávao; Dr. W. G. Van Name, November 21, 1937 (1 specimen).

Note.—Dr. Van Name's specimen from Santa Cruz is small, with R = 95 mm.

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